

**FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT**

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
Juneau, AK 99802-5526

PROJECT TITLE: Factors limiting moose at low density in Unit 19D East; and response of moose to wolf control

PRINCIPAL INVESTIGATOR: Mark A. Keech and Toby A. Boudreau

COOPERATORS: Eric Post, Pennsylvania State University

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR: W-33-2

PROJECT NR: 1.58

WORK LOCATION: The eastern portion of Unit 19D, the Kuskokwim River drainage upstream of the Selatna River.

STATE: Alaska

PERIOD: 1 July 2003–30 June 2004

I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

OBJECTIVE 1: Estimate moose numbers and population composition in Unit 19D East.

In October 2001 we conducted aerial surveys within the entire eastern portion of Unit 19D and within the Experimental Micro Management Area (EMMA), a smaller area nested within 19DE. No moose surveys were conducted in the study area during 2002 due to inadequate snow conditions. During November 2003 we again conducted aerial surveys in the eastern portion of Unit 19D and the EMMA. Weather conditions during the 2003 survey were relatively poor resulting in lower sampling intensity and lower precision of the population estimate.

OBJECTIVE 2: Determine primary causes of mortality among moose calves.

From May 2001–2004 we annually captured and radiocollared 52–81 newborn moose calves in Unit 19D East; most were captured within or near the EMMA. During the 2001–2004 period, 4 moose calves were either abandoned or trampled by their dam shortly after capture; those mortalities were censored from calculations of natural mortality. Each year we monitored calves through their first year of life and investigated causes of mortality. Annual survival rates among monitored calves ranged from 26–52% among the 2001–2003

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Please note: This is a progress report and the information contained within may be further analyzed and refined.

cohorts. Causes of mortality were categorized as predation by black and grizzly bears, predation by wolves, drowning and other non predation mortality.

OBJECTIVE 3: Determine nutritional condition, seasonal movements, and mortality rates of yearling and adult moose.

In March and April 2001–2004 we captured 40 adult and 45 yearling moose within the study area. We fitted radiocollars to each moose and obtained a blood sample, a tooth (adults only), morphometric measurements, ultrasound measurements of rump fat (adults only in 2001 and 2002), and weight (yearlings only). Collared individuals were monitored to determine reproductive indices, movements, and mortality rates. There were 2 capture-related mortalities, both yearlings, 1 each in 2001 and 2002. Survival of collared yearlings from May 2001 to May 2004 ranged from 67–80%. Survival of collared adult females ranged from 89–95%. Wolf predation was the greatest component of both yearling and adult mortality during each year of this study

OBJECTIVE 4: Determine twinning rates and age at first reproduction of moose in Unit 19D East.

During May and June 2001–2004 we monitored both collared and noncollared adult female moose from fixed wing aircraft to determine twinning and parturition rates. Twinning rates ranged from 30–59% among radio collared and 36–39% among noncollared females. Parturition rates ranged from 75–95% during the 4 year period. Through this reporting period we did not detect parturition among radiocollared 2-year-old moose. In spring 2003, 5 of 9 radiocollared 3-year-old moose were observed with calves, an observed parturition rate of 56% for that age class.

OBJECTIVE 5: Obtain data snow depth and density within the EMMA.

Annually we obtained records from the National Weather Service on snow depth within the EMMA and adjacent areas.

OBJECTIVE 6: Characterize winter moose browse in Unit 19D East.

Browse surveys were conducted in March 2003 via helicopter and snowmobile throughout the EMMA. A total of 39 locations and 236 plants were sampled within the area. Browse biomass removal in the EMMA was 20%, which falls between the range seen in areas of high moose browse use and low moose browse use. Birch, poplar, and willow species were all present in the survey area, although willow species tend to be the most preferred winter browse species in the EMMA, similar to most areas in Interior Alaska.

OBJECTIVE 7: Estimate wolf numbers in Unit 19D East and identify wolf packs that hunt moose within the EMMA.

In the March 2001 survey, 103 wolves were estimated to be present in Unit 19D East, and 19 wolves were taken from the area prior to the survey (Boudreau, ADF&G unpublished memo). Results of this survey indicate that 33 wolves in 5 “core packs” were largely resident within the EMMA. Since the March 2001 survey no additional wolf survey data was obtained. Information collected incidentally during other fieldwork and from local

trappers indicates the EMMA is still inhabited by approximately the same number of wolves, although the yearly numbers within the EMMA fluctuate because of its small size.

OBJECTIVE 8: Determine reproductive rates and condition of wolves in Unit 19D and compare rates with other wolf populations in Alaska.

We purchased 25 hunter- and trapper-killed wolf carcasses for necropsy between July 2001 and June 2002 and 30 wolf carcasses between July 2002 and June 2003. Additional carcasses were purchased between July 2003 and June 2004. Necropsies were performed in spring 2002, 2003, and 2004. Data collected from carcasses and reproductive tracts indicate wolves from Unit 19D have normal parameters of condition.

OBJECTIVE 9: Document the distribution of black bear and grizzly bear numbers within and adjacent to the EMMA and characterize bear predation on moose calves.

In a collaborative project with Pennsylvania State University, we captured 21 black bears during May and June 2002 within the study area (1 died from capture-related injuries). Preliminary analysis of data obtained by monitoring these bears indicates that most black bears use riparian areas within the central portion of the study area in spring and summer and then move to higher elevations in fall.

OBJECTIVE 10: Write annual progress reports and a final report, and publish results in peer-reviewed journals.

Federal Aid research performance reports covering 1 July 2001–30 June 2003 have been written and submitted to Federal Aid for this project, and they have been posted to the ADF&G website. Preliminary results “Causes and timing of moose calf mortality on the Kuskokwim River, Alaska” were presented at the Fifth International Moose Symposia, in Hafjell, Norway, in August 2002. Preliminary results “McGrath moose: a research and management update” were presented at the University of Alaska Fairbanks in April 2003, and “Preliminary results of removing bears to increase moose calf survival on the Kuskokwim River, Alaska” was presented at the Northwest Chapter of the Wildlife Society meeting in Girdwood Alaska in May 2004.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 1A. Estimate moose numbers and population composition in treatment and comparison areas in Unit 19D East.

During November 2003 we conducted aerial moose surveys within both the EMMA and the remainder of Unit 19DE. We estimated 580 moose (90% C.I. =457-736) in the 528 mi² EMMA and 1084 moose (90% CI= 692-1528) in the remainder of Unit 19D East (4,676 mi²). We used 4 fixed-wing aircraft to complete the surveys and provided fuel, lodging, and food for pilots and observers.

JOB 1B. Conduct moose calf mortality study to determine if the pattern of calf mortality is similar to previous studies in the Nowitna and Koyukuk drainages and the Yukon Flats

In May 2004 we captured and radiocollared 52 newborn moose calves in the EMMA. Three additional calves died when trampled by their dam following capture. Those were considered capture mortalities. Calf survival through 31 July 2004 was 80% (42 of 52 lived). We attributed 3 deaths (30%) to black bears, 4 (40%) to wolves, and 3 deaths (30%) to nonpredation causes. During this reporting period we purchased 50 moose calf collars and paid for helicopter time (R-44 and R-22) to conduct captures and onsite mortality investigations. We also provided fuel, food and lodging for pilots and biologists participating in the study.

JOB 1C. Monitor condition, movements, and mortality rates of radiocollared yearling and adult moose.

Through this reporting period, monthly locations of study animals indicated that moose within the EMMA are relatively nonmigratory. We collared 15 yearling moose in March 2003 and 15 in April 2004. Survival of yearlings was 70% from May 2003-May 2004. Survival of collared adult moose from May 2003 to May 2004 was 95%. Using helicopters and airplanes we landed and investigated causes of mortality. Wolf predation was the greatest mortality factor during these time periods, with illegal take and unknown nonpredation cause also accounting for some mortality. Monitoring movements and mortality of yearling and adult moose required expenditures for aircraft fuel, aircraft charters, and food and lodging for pilots and biologists.

JOB 1D. Determine twinning rates and age at first reproduction of moose in Unit 19D

During May and June 2004 we conducted approximately 30 flights to determine parturition and twinning rates among both radio collared and non radio collared cows. Seven of 10 radiocollared 3-year-old moose were observed with calves, giving an observed parturition rate of 70% for that age class during spring 2004. Overall parturition rate for 2004 was 75% and twinning rate was 34

JOB 1E. Survey snow depth and density within the EMMA and adjacent areas.

We obtained data on snow depth from the National Weather Service for this reporting period, but have not yet extracted summary data from that database.

JOB 2. Characterize winter moose browse in Unit 19D East browse surveys.

This job was not accomplished during the reporting period. No Federal Aid funds were used for browse surveys. Funds that were allocated for this job were used to help pay for the 2004 calf capture and monitoring project.

JOB 3A. Estimate wolf numbers in Unit 19D East and identify wolf packs that hunt moose within the EMMA

This job was not accomplished during the reporting period. No Federal Aid funds were used for wolf population estimation. Funds that were allocated for this job were used to help pay for the 2004 calf capture and monitoring project.

JOB 3B. Determine reproductive rates and condition of wolves in Unit 19D and compare rates with other wolf populations in Alaska.

During winter 2003–2004, we purchased carcasses of wolves killed by hunters and trappers and conducted post mortem examinations to determine wolf body condition, age and reproductive performance. Results of those post mortem examinations have not been compiled.

JOB 4. Document the distribution of black bear and grizzly bears numbers within and adjacent to the EMMA and characterize bear predation on moose calves.

During summer 2003 and spring 2004 we collected hair samples of bears found at calf mortality sites. During this reporting period we paid for the genetic analysis of hair samples collected during 2002, but have not yet compiled the results of that analysis.

JOB 5. Write annual progress reports and a final report, and publish results in peer-reviewed journals Literature review, data analysis, report writing, and publication of results.

The principal investigator reviewed additional literature on moose calf mortality, DNA analysis, and methods to evaluate browsing intensities by moose. The annual progress report for the period 2002–2003 was completed in August 2003.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

IV. PUBLICATIONS

KEECH M.A., T.A. BOUDREAU, AND P. VALKENBURG. 2002 (posted to the ADF&G website). Factors limiting moose at low density in Unit 19D East, and response of moose to wolf control and increased bear harvest. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration Research Performance Report. Grant W-27-5. Project 1.58. Juneau, Alaska.

KEECH M.A., AND T.A. BOUDREAU. 2003 (posted to the ADF&G website). Factors limiting moose at low density in Unit 19D East, and response of moose to wolf control and increased bear harvest. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration Research Performance Report. Grant W-27-5. Project 1.58. Juneau, Alaska.

KEECH M.A., T.A. BOUDREAU, AND P. VALKENBURG. 2002. Causes and timing of moose calf mortality on the Kuskokwim River, Alaska. Fifth international moose symposia, oral presentation, August 2002. Hafjell, Norway.

KEECH M.A. 2003. McGrath moose: a research and management update. University of Alaska Fairbanks, oral presentation, April 2003. Fairbanks, Alaska.

KEECH M.A. 2004. Preliminary results of removing bears to increase moose calf survival on the Kuskokwim River, Alaska. Northwest Chapter meeting of the Wildlife Society, oral presentation, May 2004. Girdwood, Alaska.

V. RECOMMENDATIONS FOR THIS PROJECT

This project was initially set up as part of an adaptive management plan that was based upon continually changing methods and goals as determined necessary by the public, Alaska Department of Fish and Game, and other stakeholders. We recommend this project continue to be flexible in the study design and protocol as more information is gathered and as circumstances change.

VI. APPENDIX

None.

VII. PROJECT COSTS FOR THIS SEGMENT PERIOD

FEDERAL AID SHARE \$171,203 STATE SHARE \$57,068 = TOTAL \$228,271

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